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ABSTRACT

A comparative analysis of two decision making strategies was conducted. One strategy compared alternatives on their best attributes for "the best payoff," while the other strategy called for accepting the first alternative that achieved all minimum cutoff values for all attributes. The subjects, 211 college students, selected a mayoral preference from a group of four unnamed candidates. A three-factor design manipulated the decision making strategy employed, the information format, and the complexity of the decision. Dependent variables were the facilitation of the decision making process and user satisfaction with the decision. The results replicated previous analyses, showing that format had an independent effect on decision making facilitation. They also supported the hypothesized importance of matching formats and strategies to facilitate certain dimensions of decision making. Although it was hypothesized that the strategy for best payoffs would be facilitated by an attribute-by-attribute information format, the alternative-by-alternative format did more to facilitate the choice and reduce cognitive strain for subjects. Subjects using the strategy accepting first alternatives reported lower levels of cognitive strain when information was given attribute by attribute. There was a main effect for the presentation of information alternative by alternative. No significant interaction was found between strategy, complexity, and information presentation. (RL)

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FITTING INFORMATION PRESENTATION FORMATS TO DECISION-MAKING STRATEGIES TO FACILITATE DECISION-MAKING

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FITTING INFORMATION PRESENTATION FORMATS TO DECISION-MAKING STRATEGIES TO FACILITATE DECISION-MAKING

A growing number of mass communication theorists are beginning to realize the need to expand the search for mass media effects to non-traditional independent and dependent variables. On the independent variable side this trend has been evidenced by research into structural as opposed to content characteristics of various mass media (Lometti, Reeves and Bybee, 1977; Krull, Watt, and Lichty, 1977; Bettman and Kakkar, 1977). On the dependent variable side, this trend can be seen in the recent development of measures such as agenda setting and information holding, which assess effects that are not directly related to persuasion (Becker, McCombs and McLeod, 1975; Chaffee, 1977). Initial work in these areas shows promise and argues for continued attention and exploration.

It is in this context that the present study continues an investigation into the role information presentation format (a structural independent variable) plays in the facilitation of decision-making (a non-persuasive effect) (Bybee, 1980). A theoretical approach to structuring communication messages is outlined and an initial test of the approach is performed. The research question addressed is this: Can the job of decision-makers be made any easier by providing them with information organized to fit the decision-making strategy they intend to execute? The question can be stated a bit more formally. Given that decision-makers have available to them a variety of decision-making strategies and that the use of these strategies is contingent upon a number of situational variables, is it possible to facilitate the implementation of any given strategy through the appropriate structuring of informational input?

To address the central research question, several more basic questions must be answered first. What are the various formats in which information can be presented? Do people use different decision-making strategies? If

so, what are they? Are they contingent on situational variables or personality characteristics, or both? What information presentation formats are most appropriate for particular decision-making strategies, and under what conditions? Finally, what are the criteria for evaluating the facilitation of decision-making?

Information Presentation Formats

The term information presentation format is used to refer to the manner in which information is organized by a communicator for a decision-maker. Writing on consumer decision-making, Chaffee and McLeod (1973) identify what could be considered an ideal information presentation format. Each choice (alternative or object) is arrayed across the top of a matrix. Each characteristic (attribute) upon which the choices might be compared constitutes a row. The value of each alternative on each attribute is then entered into the appropriate cell-either by the information seeking decision-maker or some communicator. Ideally the decision-maker can simply scan this decision-matrix, make a summative evaluation and arrive at an acceptable choice. Although decision-making seldom preceeds in such a simple fashion, the notion of a decision matrix provides an ideal on how information for decision-making might be organized.

Concern over the organization of information is not new to those responsible for disseminating information. This concern has, however, been limited almost entirely to information about single choices. That is, in terms of decision-making, the concern has been largely with the organization of information about the various choice alternatives, but seldom with the organization of information across choice altenratives.

Working from the Chaffee and McLeod decision matrix there are three basic information presentation formats possible. They are the attribute-

by-attribute organization (providing information about all choices on one attribute at a time) the alternative-by-alternative organization (providing information about each attribute one choice at a time) and the matrix organization where information is presented in a format identical to the theoretical decision matrix proposed by Chaffee and McLeod.

Unfortunately, the matrix format bears little resemblence to the organization of most information, with the possible exception of the information in Consumer Reports. Additionally the matrix format is probably not a realistic option for many types of decision-making situations. For example, it is difficult to imagine a few words that might be entered into the cell of a decision matrix which represents the intersection of a presidential candidate (alternative) with a particular issue (attribute), for instance unemployment, that could adequately convey the candidate's position. The present study focuses only on the two more realistic, more general information presentation formats.

Strategies of Decision-Making

Decision-making strategies can be categorized as primarily either optimizing or satisficing strategies (Janis and Mann, 1977). Optimization strategies have as their goal the selection of the choice alternative which will yield the highest payoff. They require the estimation of the comparative value of every viable alternative in terms of potential benefits and costs. The cognitive exertion, the time, and the physical cost of such strategies are often high (Wright, 1975). The likelihood of "information inundation" or information overload is also high (Miller and Star, 1967; Jacoby, Speller and Kohn, 1974). For these reasons certain researchers view optimization strategies simply as the ideal or normative model against which other strategies can be judged.

Responding to these criticisms of optimizing as a pragmatic description of typical decision-making strategies, Simon (1976) introduced the concept of satisfying. An individual using a satisfying strategy, according to Simon, looks for a course of action that is "good enough," that is, one that meets a minimal set of requirements. A satisficing strategy, then, requires less cognitive work. If an individual is only looking for an improvement over the current state of affairs, it is only necessary to consider alternatives one at a time. The first alternative that looks as if it may be an improvement can be selected. The simplest satisficing strategy would be the use of a single criterion for making an acceptable choice.

Between an absolute optimizing strategy and the simplest one-criterion satisficing strategy there lies, of course, a large number of intermediary strategies. However, for the sake of presentation the dichotomous categorization of strategies into either optimizing or satisficing will be retained. Specific strategies under each heading will be described.

Optimizing Strategies

In selecting strategies for inclusion in this category, the following criterion was used: since an individual attempting to optimize his/her choice is interested in the extent to which the strategy permits his/her to do justice to his/her personal objective function, an optimizing strategy should necessitate considering data for each option on all subjectively nontrivial dimensions (Wright, 1975).

Compensatory Strategies. Compensatory strategies are where a surplus on one attribute of an object to be evaluated compensates for a shortage on another attribute. Coombs (1964) identifies two distinct compensatory strategies. The first is a weighted linear-compensatory model where the

individual constructs a weighting function to indicate the degree of importance of each attribute in arriving at a total evaluation for an object. The second is the unweighted linear-compensatory model where the importance of each attribute is considered equal. Additional variations on compensatory strategies concern whether the combination of attribute values (weighted or unweighted) is through averaging and adding (Anderson, 1973; Green and Wind, 1974).

Conjunctive Strategy. This is the first of the noncompensatory models. The conjunctive model assumes that the individual sets up minimum cutoffs on each attribute. If an alternative has any below-cutoff values on an attribute, the alternative is rejected (Coombs, 1964; Wright, 1975). The implication of this procedure is that a choice must have a specified minimum value on all attributes. One problem with the procedure is that is not always certain to identify a unique choice. Several alternatives may prove acceptable. In such cases a secondary rule is required to solve this problem. Simon (1958) suggests a very simple secondary rule. Wright (1975) labels it a FIRST rule, which calls for the individual to choose the first alternative qualified by the conjunctive strategy.

Minimax and Maximax Strategies. An individual using the minimax model compares alternatives on their worst attributes. An alternative is rejected if another alternative's worst attribute is less bad or if another alternative has fewer equally bad attributes. In essence, the individual is minimizing maximum losses. The maximax model implies that the individual does just the opposite. In this case, the individual compares alternatives on their best attribute, selecting one alternative over another if its best attribute is more desirable/salient/important or if it possesses more best attributes of equal desirability/salience/importance (Wright, 1975).

Satisficing Strategies

All of the following satisficing strategies are noncompensatory.

Lexicographic Strategy. In the lexicographic model attributes are first ordered in terms of importance. Then each alternative is compared on the single most important attribute. If the individual thinks that one alternative is clearly the most desirable on that attribute, it is chosen. If the individual is unable to make a decision between the alternatives based on the first most important attribute, then a comparison of the alternatives on the second most important attribute is made. This procedure is repeated until a comparison yields a unique choice (Coombs and Kao, 1955; Coombs, 1964; Dawes, 1964).

Disjunctive Strategy. The disjunctive model can be considered the inverse of the conjunctive model. As with the conjunctive model the individual sets up minimum cutoffs on each attribute. Unlike the conjunctive model where alternatives are rejected if they have any below-cutoff values on attributes, in the disjunctive model alternatives are accepted if they have any above cutoff values on the attributes. Once again the problem of multiple solutions appears and must be solved using some sort of secondary rule.

Sequential Elimination (elimination by aspects) Strategy. Tversky (1972) describes a choice model where, similar to the conjunctive and disjunctive models, the individual sets up cutoffs on each attribute. Each alternative not possessing a value superior to the cutoff on the most important attribute is eliminated. Then each alternative is compared on the second most important attribute. Any alternative not meeting the cutoff for that attribute is eliminated, and so forth until a unique choice is found or all attributes are considered.

Empirical Evidence Regarding the Use of Decision-Making Strategies

Basically three methods have been used to gather data on whether the hypothetical models described are actually used by people making decisions. There are the measurement of information acquisition (Jacoby, Chestnut, Weigel, and Fisher, 1976; Payne, 1976; Bettman and Jacoby, 1976; Bettman and Kakkar, 1977), a data fitting procedure where various mathematical -representations of decision-making strategies are compared to decision data sets for goodness of fit (Park, 1976; Russ, 1971; Heeler, Kearney, and Mehaffey, 1973; Wright, 1973), and a prescribed role approach where subjects are asked to respond how they feel about applying various strategies under different circumstances (Wright, 1975).

While any one of the three methods by itself may be questioned on methodological and theoretical grounds, the evidence taken across the three methods is quite formidable. Individuals do appear to use decision-making strategies similar to those described above. Additionally, the use of these strategies seems to be contingent upon a number of situational factors. A study regarding the facilitation of decision-making must therefore focus not only on the characteristics of the strategies employed but also upon situational factors.

Fitting Information Presentation Formats to Decision-Making Strategies

Since it would be impossible to examine all possible strategies in a single study, it would seem that the best approach would be to look at a subset of the strategies which are most representative of all the possible models. This is the approach adopted here.

Key Characteristics of Decision-Making Strategies. In organizing the earlier discussion of decision-making strategies the optimization-satisficing distinction was introduced. Implicit in this distinction are a number of

important dimensions. A table has been constructed to help clarify the relationship between these dimensions and the various strategies (see Table 1). The first dimension of interest is the extent to which a particular strategy requires the consideration of all possible alternatives in the choice environment. This information is summarized in column two of the table. Seven strategies require at least a cursory look at all possible alternatives. Only three strategies require the user to consider all information on all attributes, although it is possible the other strategies may in the end necessitate such a review if a choice does not become available based on earlier comparisons. Seven strategies operate on a "choose the best" choice rule (Wright, 1975). This is as opposed to "choose the least worst" or "choose the first satisfactory" rules. The next column summarizes whether or not a particular decision-making model implies that the individual will process information alternative-by-alternative. Here there is no clear break between the optimizing and the satisfying strategies. The same is true for attribute-by-attribute processing.

In selecting decision-making strategies which most clearly reflect the differences embodied in the optimizing-satisficing distinction while at the same time contrasting potential preference for information presentation format, two models stand out. The maximax optimizing strategy and the disjunctive satisficing strategy (employing the FIRST secondary rule). The question now becomes, can the execution of these two distinct decision-making strategies be facilitated by organizing information with respect to the data combination/evaluation procedure implied by each? Before attempting to expand on the meaning of facilitation, let me first introduce a potentially important control variable.

Contingent Condition. Several studies have found situational variables such as complexity, prior familiarity, etc. to exert a significant impact on the decision-making strategy implemented by an individual (Bettman and Kakkar, 1977; Heeler, Kearney and Mehaffey, 1973; Wright, 1973; Park, 1976). Based on the demonstrated importance of these variables, the present research seeks to continue the investigation into situational variables, but looks at their effect from a somewhat different perspective. Instead of looking at how situational variables influence decision-making strategy, the question is turned around to ask, if an individual has committed him- or herself to a particular decision-making strategy (optimization for instance), how will various third variables influence his or her ability to execute the strategy? The third variable, or situational variable, selected for the present study is the complexity of the decision, as indexed by the amount of information available for each alternative.

Facilitation of Decision-Making

An important problem confronting the researcher attempting to investigate the facilitation of decision-making is the nature of the criterion to be used. The basic issue is whether the intent of an information presentation format is processing or policy normative. In the processing normative case the intention is only to aid the consumer in perceiving and processing appropriate information. In the policy normative case the communicator attempts to influence the outcome of the decision-making process. The focus in the present study is on information presentation formats where the intent is processing normative. The adoption of this perspective acknowledges the beginning of a shift in the study of mass communication effects from directional to non-directional

variables that is, from persuasive to information transmittal functions of the mass media (Chaffee, 1977). The importance of this shift lies in the necessary reconceptualization of the role of the communicator it requires. Whereas the study of directional effects of the mass media implies that the communicator is seen largely as the source of messages, the study of non-directional effects reemphasizes the fact that the communicator's primary role is transmitting information from a source to a receiver.

Facilitation in the processing normative sense can be examined at the encoding and evaluation stages of the decision-making process. Facilitation of encoding can be assessed by a person's ability to recall information pertaining to the decision. Facilitation of evaluation can be determined indirectly by measuring a person's degree of immediate satisfaction with a decision. Relevant dimensions of satisfaction include the individual's desire to reconsider the choice, the expressed satisfaction with the choice, confidence in the choice, and absence of regret concerning the choice (Janis and Mann, 1977).

Two additional measures of facilitation common to the decision-making literature are included. These are time required to make a decision and amount of stress a person encounters in making a decision. While these measures are considered important indicators of facilitation it is likely that their levels are partially determined by both stages of the decision-making process mentioned above.

Research Hypotheses

The research hypotheses, based on the preceding theoretical discussion can be stated as follows:

H_1: For subjects implementing the maximax strategy, information presented in the attribute-by-attribute format should facilitate the process of decision-making and result in greater satisfaction with the chosen alternative as compared to subjects using the same strategy but having the information presented in the alternative-by-alternative format.

H_2: For subjects using the disjunctive strategy, information presented in the alternative-by-alternative format should facilitate the process of decision-making and result in greater satisfaction with the chosen alternative as compared to subjects using the same strategy but having information presented in the attribute-by-attribute format.

While both of these hypotheses can provide preliminary evidence in support of the research hypothesis, the possibility that one format may be the best facilitator across both strategies could result in an ambiguous pattern of results. Therefore it is necessary to perform a simultaneous test of both hypotheses. This is accomplished in the third hypothesis.

H_3: For subjects implementing the maximax strategy when information has been presented in the attribute-by-attributive format and for subjects implementing the disjunctive strategy when information has been presented in the alternative-by-alternative format, the process of decision-making should be facilitated and result in greater satisfaction with the chosen alternative as compared to subjects implementing the maximax strategy when information presentation has been in the alternative-by-alternative format and subjects implementing the disjunctive strategy when information presentation has been in the attribute-by-attribute format.

The prediction in hypothesis three is essentially a transverse first-order interaction between decision-making strategy and information presentation format on facilitation.

The fourth hypothesis is the result of the introduction of complexity as a contingent condition. The rationale is straightforward. In the low complexity condition there should be little or no difficulty for the subject to overcome the physical organization of the information implicit in the two information presentation formats. With only two issues per candidate it is quite likely the subject can hold in his/her memory the

necessary information to execute an attribute-by-attribute comparison or an alternative-by-alternative comparison. Consequently one would expect the influence of the information format presentation to be greater in the high than in the low complexity condition. This expectation yields the fourth hypothesis:

H_4: The effect predicted in H_3 will be greater in the high complexity condition than in the low complexity condition.

METHOD

Design

The experiment employed a three-factor completely randomized design. The three independent variables were decision-making strategy employed, information format, and complexity of decision made. The dependent variables were the facilitation of the decision-making process and satisfaction with the chosen alternative. In the decision-making strategy factor, two types of decision-making strategy were employed (maximax, disjunctive) and a control group which was told to make their decision based on whatever strategy they desired.[1] The information presentation format factor had two levels; attribute-by-attribute presentation or alternative-by-alternative presentation. The complexity of decision factor was dichotomized into high and low complexity. Analysis of variance was performed on the 3 x 2 x 2 design using Scheffe's (1959) correction for unequal n's to provide an estimate of within-groups variance. The method of planned comparisions was used to directly test the study's hypotheses.

Subjects

The study was conducted in sixteen introductory public speaking classes in the Communication Arts Department at the University of Wisconsin-Madison. The total number of subjects was 211. This provided approximately 18 subjects per condition in the design.

Procedure

The study was introduced to subjects in the introductory classes as an investigation by the Mass Communication Research Center into how people make decisions. Each subject was then given a booklet containing instructions and decision information written to effect one of the twelve experimental conditions. Subjects were told that not only did the investigators want to find out how people make decisions in general, but how they make decisions under special circumstances. Therefore, they were told it was important for them to carefully read the instructions to their booklet before making the decision presented to them.

The booklet contained three parts:

Part 1) The introduction to the decision was used to manipulate the decision-making strategy to be used by the subject. The decision-making strategy the subject was expected to employ was carefully described and portrayed as the only appropriate strategy for the particular decision they faced. Subjects were instructed to review the strategy until they felt ready to use it without turning back to the description. The introduction either induced the maximax strategy, the disjunctive strategy, or allowed the subject to employ whatever strategy he/she desired.

Part 2) The decision required of the subject and the information upon which the person must base his/her decision was presented. Information

was presented as newspaper clippings to enhance the external validity of the manipulation. The decision required individuals to indicate a mayoral preference from among a group of four unnamed candidates. Candidate names were eliminated as well as party affiliation since knowledge of either might have suggested to the decision-maker more information (due to association) than simply the candidates' stands on the issues. Subjects were randomly assigned to conditions of either high or low levels of complexity. Subjects were also randomly assigned to information presentation formats (either attribute-by-attribute or alternative-by-alternative).

Part 3) Following the decision, subjects were required to answer a number of questions concerning length of time required to make decision, recall of candidates' stands on issues, the cognitive strains involved in making their decisions and the degree to which they were satisfied with their final choice.

Operational Definitions

Decision-making strategy. Subjects were instructed in the use of the maximax or disjunctive (first rule) strategy according to the description of the strategy given earlier.

Information presentation format. The operational definition is the organization of information for a particular choice task. Two dimensions of organization were used. Either information was organized by attributes (issues) or it was organized by alternatives (candidates).

Decision complexity. Complexity was operationalized to refer to the amount of information as indexed by the number of attributes per alternative associated with a particular decision (Russo, 1974).

In the low complexity condition the choice task involved only two issues and in the high complexity condition the choice task involved six issues.

Facilitation of decision-making: encoding. Encoding, operationalized as information recall, was measured by asking subjects to fill in a grid formed by the candidates across the horizontal axis and issues across the vertical axis. In each of the candidate-by-issue cells, subjects were instructed to indicate whether the candidate was in favor or opposed to the particular issue. The issues were chosen and the candidates' stands constructed so as to make this task possible.

Facilitation of decision-making: satisfaction with choice. Eight ten-point scales were constructed to measure several dimensions of satisfaction. The eight self-report measures included desire to reconsider one's choice if more time was available, the desire to reconsider one's choice if more information was available, the degree of satisfaction with one's choice given the restrictions of the study, the degree of satisfaction with one's choice in comparison to the choice one might have made on one's own, one's degree of confidence in the choice, one's willingness to defend his/her choice to peers, the degree of certainty one expressed in his/her choice, and the amount of post-decisional regret one felt.

Facilitation of decision-making: other variables. Two additional measures of facilitation were included in the study. The first was the amount of time required for the decision which was measured by having subjects indicate the exact time at which they began the choice task and the exact time they entered their decision in the experimental booklet. The second was a two-item cognitive strain index. Subjects were asked to report how worried or nervous they were while making their choice and whether they experienced any feelings of stress or anxiety on ten-point scales.

RESULTS

Induction Success

Perceived compliexity was the criterion for examining the success of the complexity induction. A planned comparison indicated that subjects in the high complexity group perceived their decision-making task to be significantly more complicated than subjects in the low complexity condition ($t = 2.44$; d.f. - 1,199; $p < .01$).

Reliability

The first index, measuring cognitive strain, yielded an unstandardized Cronbach's (1951) alpha of .90. The satisfaction index had an unstandardized Cronbach's alpha of .88. The overall reliability of the two indices was judged acceptable.

The Hypotheses

All t-values for the orthogonal planned comparisons were subjected to a one-tailed test in accordance with the theoretical predictions. If a value was in the opposite direction of prediction, a two-tailed test of significance was performed.

Table 2 contains a summary of results of the planned comparisons for the two hypotheses. Cell means for each of the dependent measures are reported in Table 3 through 6.

Hypothesis One

Only one of the four planned comparisions yielded a statistically significant t-value and this was in the opposite direction of prediction. It is the alternative-by-alternative information presentation format,

not the attribute-by-attribute format, which is found to contribute to higher levels of information recall ($p < .01$) for subjects employing the maximax strategy.

Hypothesis Two

Two of the four planned comparisions yield statistically significant t-values and these are both in the direction of prediction. The alternative-by-alternative format appears to lead to higher levels of information recall and requires less time for decision making than the attribute-by-attribute format for subjects using the disjunctive strategy.

An inspection of cell means reported in Table 3 reveals that the confirmatory results in H_2 and the disconfirmatory results in H_1 are due to a main effect of the alternative-by-alternative format. Although this result is consistent with earlier analyses of subjects who employed no specific decision-making strategy (Bybee, 1980), it is not consistent with the interactive effect between format and strategy hypothesized in the present study.

Hypothesis Three

A specific test of this interactive hypothesis provides some interesting results. A highly significant transverse interaction between strategy and format emerged for the cognitive strain index. This result, however, was in the opposite direction of prediction. Alternative-by-alternative information presentation appears to lead to greater facilitation, by reducing cognitive strain, for subjects implementing the maximax strategy as compared to subjects implementing the same strategy but receiving information in the attribute-by-attribute format. The opposite results

seems to hold true for subjects implementing the disjunctive strategy. That is, the attribute-by-attribute strategy is associated with lower levels of cognitive strain.

Hypothesis Four

No significant second-order interaction between strategy, complexity and information presentation format was found.

Summary of Results

The results for H_1 turned out to be contrary to predictions while results for H_2 were in the expected direction. The reason for these inconsistent findings appeared to be due to a main effect for the alternative-by-alternative format on information recall and time for decision. A specific test of the strategy-by-format interaction did reveal a significant effect on the cognitive strain index. This effect, however, was in the opposite direction of prediction.

DISCUSSION

The purpose of this paper was to introduce a theoretical approach to structuring communication messages for decision-makers and to provide an initial test of that approach. The results were satisfying in that 1) they provided a replication of previous analyses which found format to have an independent effect on decision-making facilitation (Bybee, 1980) and 2) they support the hypothesized importance of matching formats and strategies to facilitate certain dimensions of decision-making. The direction of this first-order transverse interaction, however, was in the opposite direction of prediction.

Because these findings turned out to be counter-hypothetical, some difficult questions must be posed. Is there really something there? What might account for the counter-hypothetical findings? And what needs to be done next?

Three reasons argue for concluding that the transverse interaction between information presentation format and decision-making strategy on cognitive strain is externally valid. The first is that the present research was not an exercise in data dredging. There was a theoretical justification for focusing on the interaction of these two variables. The fact that the interaction which resulted was counter-hypothetical calls into question the logic of prediction, but it should not be allowed to discount the potential importance of the relationship between these two variables. The second reason is that the measure of cognitive strain is a composite measure with a high degree of internal reliability. The third reason is that evidence has been gathered which suggests that information presentation format is a significant determinant of decision-making facilitation. This evidence, based on the analysis of the control groups from this data set, has been reported elsewhere (Bybee, 1980).

The second question concerns the counter-hypothetical findings. An explanation of this result is best attempted by considering the finding for each strategy independently. It was expected that the alternative-by-alternative format would facilitate the decision-making task for subjects implementing the disjunctive strategy. Exactly the opposite happened. It turned out that the attribute-by-attribute format did more to facilitate the choice task for this group. One explanation for this finding is that while subjects felt confident in their understanding and ability to follow the instructions given them concerning the strategy, they may

have cognitively balked at executing the fourth step in the instructions when presented with information organized alternative-by-alternative.

The fourth step in the instructions called for subjects to choose the first candidate acceptable to them on any issue. In the alternative-by-alternative (candidate-by-candidate) condition this essentially meant they would have been "one-candidate" voters. While the occurrence of "one-candidate" (one party) voting is a well established phenomenon, in the present study two key ingredients for this type of behavior were missing (Nie, Verba, and Petrocik, 1976).

No information was provided regarding the individual candidates' personalities or party affiliation. The risk of making an unsatisfactory choice after having been exposed to only one candidate (the first alternative) would have been great. Without party or personality data, subjects were forced into becoming issue voters (one issue voters if they attempted to carefully follow their instructions). To vote by issue, subjects needed at least one issue to compare all candidates on. The attribute-by-attribute format provided this minimal comparison.

The key to this explanation is of course the subjects' need for adequate criteria for comparison. The above explanation would not be plausible if subjects had been able to completely follow the initial three steps in their instructions. These instructions essentially called for subjects to construct internal criteria for each issue upon which individual candidate's stands could have been judged. If they had been able to do this there would have been no need to compare issues across candidates (seek out attribute-by-attribute organization). One reason why subjects may not have been able to construct such internal criteria is that they had not made up their own minds on what stand to

take on each issue. Therefore, they were reviewing information to make up their minds, first, on where they stood on the issues and only after they had taken a stand did they review the information to decide for whom to vote.

To complete this explanation, the result for the maximax strategy must be considered. Contrary to expectations the alternative-by-alternative format did more to facilitate the choice task than the attribute-by-attribute format for subjects implementing the maximax strategy. The simplest explanation is that subjects did exactly as they were instructed. The maximax strategy was selected as representative of strategies that implied attribute-by-attribute processing. The maximax strategy, however, proceeds in two steps. The first step is somewhat of a "within" candidate review of information to establish on which issue that candidate is most appealing. The second step is comparing candidates on the basis of their most appealing attributes. The second step is, of course, the most important in terms of coming to a choice and is the basis for the prediction that the greatest facilitation will come from the attribute-by-attribute format. The potential problem and possible explanation for the opposite result comes from a methodological step taken to strengthen the format manipulation.

If subjects closely followed their instructions, their first step would have been an alternative-by-alternative review of the candidates. Their second step would have been the comparison of the candidates by attributes. If the subjects had been permitted to turn back and forth between news stories (they were not in order to strengthen the format manipulation) either format would have probably been satisfactory for arriving at a decision, with the attribute-by-attribute format providing

the somewhat better facilitator due to its correspondence with the crucial second step in the maximax evaluation procedure. However, subjects were not permitted to turn back. This may have resulted in a serious handicap for the attribute-by-attribute format since it corresponded to the second and not the first step in the maximax evaluation procedure.

Further Research

Much work remains to be done to explain the nature of the strategy x information format interaction. Several lines of research are suggested. The first is the need to assess the differential impact of information presentation format as subjects' familiarity with the information being presented varies. This research need was mentioned above. In the present context, however, it must be extended to include the possible interactive effects of strategy. Measures of perceived risk of decision as well as facilitation of decision-making must be included. The notion to be tested is that as familiarity with the information presented decreases, perceived risk in using the alternative-by-alternative information presentation format increases--especially when one does not plan to review all alternatives. This hypothesis is consistent with Russo (1974) who argued that a four alternative, six attribute decision is not equivalent to a six alternative, four attribute decision, even though the amount of information in a decision matrix could be considered approximately equal. Ignoring several attributes in arriving at a decision is not quite as risky, in the eyes of the decision-maker, as ignoring several alternatives.

Another piece of research suggested by the explanation of results given earlier, is an examination of information format preferences and impact based on whether or not subjects have committed themselves to positions on each alternative. The prediction here would be that the alternative-by-alternative format would be more facilitative for subjects who had already committed themselves to positions on the attributes (set up minimum cut-off values) than for subjects who were still reviewing information to make up their minds about their own position on the attributes.

Finally, there is a need to examine the effect of enabling subjects to review the news stories, whatever their format, as they make their decision. It may be that, as suggested earlier, for subjects employing the maximax strategy, not allowing them to review stories may effectively reduce the usefulness of the attribute-by-attribute format for this group. An investigation of this hypothesis may prove particularly important with reference to the issue of sequential presentation mentioned earlier. Due to the nature of the medium, television presentation of information will always resemble the manipulation used here. There is no opportunity to turn back to a previous story to reconsider it. Newspaper presentation does, however, allow for more flexibility in presentation.

FOOTNOTE

1. Data was gathered on subjects employing the decision-making strategy of their choice in order to assess the independent contribution of information presentation format to decision-making facilication.

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TABLE 1

CHARACTERISTICS OF OPTIMIZING VS. SATISFICING DECISION-MAKING STRATEGIES

Decision-making Strategy	Optimizing vs. Satisficing	Consider all Alternatives	Consider all Attributes	Choose Best	Compare by Alternative	Compare by Attribute
Minimax	Optimizing	Yes	Yes	Yes	No	Yes
Maximax	Optimizing	Yes	Yes	Yes	No	Yes
Compensatory	Optimizing	Yes	Yes	Yes	Yes	No
Conjunctive (dependent on secondary rule)	Optimizing	Yes	No	Yes	Yes	No
Conjunctive (based on FIRST secondary rule)	Satisficing	No	No	Yes	Yes	No
Lexicographic	Satisficing	Yes	No	Yes	No	Yes
Disjunctive (based on FIRST secondary rule)	Satisficing	No	No	No	Yes	No
Disjunctive (other)	Satisficing	Yes	No	No	Yes	No
Sequential Elimination	Satisficing	Yes	No	Yes	No	Yes

TABLE 2

SUMMARY OF RESULTS FROM PLANNED COMPARISONS[1]

	t	d.f.	significance
Hypothesis One			
Information Recall	-2.99	1,199	.01*
Satisfaction	1.33	1,199	
Time for Decision	-1.15	1,199	
Cognitive Strain	-1.19	1,199	
Hypothesis Two			
Information Recall	1.84	1,199	.05
Satisfaction	- .66	1,199	
Time for Decision	1.81	1,199	.05
Cognitive Strain	-1.33	1,199	
Hypothesis Three			
Information Recall	- .75	1,199	
Satisfaction	.98	1,199	
Time for Decision	.45	1,199	
Cognitive Strain	-3.56	1,199	.01*
Hypothesis Four			
Information Recall	- .38	1,199	
Satisfaction	- .53	1,199	
Time for Decision	- .21	1,199	
Cognitive Strain	- .11	1,199	

1. NOTE: The sign of the t-values refers to the hypothesized direction of effect. An asterisk indicates that the level of significance shown is based on a two-tailed test.

TABLE 3

MEAN SCORES OF OBJECTIVE PROCESS FACILITATION BY COMPLEXITY, DECISION-MAKING STRATEGY AND INFORMATION PRESENTATION FORMAT

Decision-making Strategy	High Complexity		Low Complexity	
	Information Presentation Format		Information Presentation Format	
	Alternative	Attribute	Alternative	Attribute
Maximax	24.47	18.00	21.18	21.00
Disjunctive	24.72	19.06	20.56	20.61

TABLE 4

MEAN SCORES OF INFORMATION RECALL AND TIME FOR DECISIONS BY COMPLEXITY, DECISION-MAKING STRATEGY AND INFORMATION PRESENTATION FORMAT

	Information Recall			
	High Complexity		Low Complexity	
Decision-Making Strategy	Information Presentation Format		Information Presentation Format	
	Alternative	Attribute	Alternative	Attribute
Maximax	14.59	9.71	6.12	5.78
Disjunctive	13.50	10.00	5.44	5.55

	Time for Decision			
	High Complexity		Low Complexity	
Decision-making Strategy	Information Presentation Format		Information Presentation Format	
	Alternative	Attribute	Alternative	Attribute
Maximax	11.12	12.71	5.94	5.78
Disjunctive	9.78	11.94	5.89	5.94

TABLE 5

MEAN SCORES OF SUBJECTIVE PROCESS FACILITATION (COGNITIVE STRAIN) BY COMPLEXITY, DECISION-MAKING STRATEGY AND INFORMATION PRESENTATION FORMAT

Decision-making Strategy	High Compelxity		Low Complexity	
	Information Presentation Format		Information Presentation Format	
	Alternative	Attribute	Alternative	Attribute
Maximax	4.76	6.41	7.29	8.11
Disjunctive	7.28	6.18	8.61	7.00

TABLE 6

MEAN SCORES OF SATISFACTION WITH CHOSEN ALTERNATIVE BY COMPLEXITY, DECISION-MAKING STRATEGY, COMPLEXITY OF DECISION, AND INFORMATION PRESENTATION FORMAT

Decision-making Strategy	High Complexity		Low Complexity	
	Information Presentation Format		Information Presentation Format	
	Alternative	Attribute	Alternative	Attribute
Maximax	41.00	42.71	37.65	43.00
Disjunctive	39.72	41.59	37.11	38.67